Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Mixed pairing state in Ru microdomains embedded in bulk single-crystal Sr_2RuO_4 ZHENYI LONG, KELLY MCCARTHY, CHRYSAFIS ANDREOU, DAVID CAVEN, The Pennsylvania State University, ZHIQIANG MAO, Tulane University, HIROSHI YAGUCHI, YOSHITERU MAENO, Kyoto University, YING LIU, The Pennsylvania State University — We performed detailed tunneling measurements on Ru microdomains embedded in Sr_2RuO_4 using In-Ru/Sr_2RuO_4 junctions prepared by pressing freshly cut pure In wire onto a cleaved *ab* face of a Ru-containing Sr_2RuO_4 single crystal. We observed a superconducting transition temperature of 0.45 K and a $T = 0$ superconducting energy gap of 0.10 meV that are associated with the Ru microdomains. The systematic behavior observed in the tunneling spectra, including the presence of a Josephson coupling between In and Ru, a zero bias conductance peak (ZBCP), an unusually large magnitude and the temperature and magnetic field dependences of the superconducting energy gap, suggests that both *s*- and *p*-wave pairings are present simultaneously in the interior of a Ru microdomain. We propose the existence of a novel superconducting state featuring the mixing of the *s*- and the *p*-wave pairings in this unique superconducting system and discuss the properties of this mixed pairing state.

Haohua Wang
Department of Physics, The Pennsylvania State University

Date submitted: 20 Nov 2006 Electronic form version 1.4